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MEMORANDUM FOR: Hank Also Bill

For your info. Jim Irwin sent this as a report of his visit last month.

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Notes on the Grain-Coating Project

A. Problems Encountered

1. Difficulty in defining and counting grains in groups.
2. Difficulty in distinguishing developed grains from undeveloped grains.

B. Corrective Measures Taken

1. Removed polarizing filters from microscope system. Changed light source from xenon to tungsten. Operated under oil immersion only. These changes eliminated the aberration around the crystals noted on earlier photographs and should allow differentiation of silver grains within groups and between developed and undeveloped grains. An added advantage in changing the system was in reduction of exposure time from 15 to 20 min to 1 min, thus decreasing the chance for defocusing during exposure. Considerable difficulty was experienced in obtaining the proper exposure because the exposure meter was not in operation and the shutter control device was also not working. Certain vignetting effects were noted on the photographs possibly due to alignment problems with the condenser. This should be corrected and any further reduction in exposure time would help in the final picture quality.

2. It was felt that the additional step of xeroxing the final print created more work without improving the accuracy if satisfactory pictures are used in the first place. Simply by marking each grain when counting on the original photograph should be sufficient.

3. Once the pictures of one step of the wedge are taken, the counting and calculating should be carried through to its conclusion rather than taking pictures of all twenty-one steps, then counting all the grains in these pictures, etc. This will allow development of a curve from selected steps rather than a time consuming analysis of all the steps.

4. The question of the number of grains to be counted in the interest of accuracy was raised during our visit. First of all, it must be stressed that this experiment serves primarily to demonstrate an effect. It is unlikely that its accuracy will ever allow it to measure the effect quantitatively. It is therefore unnecessary to dwell too long on questions of increased accuracy. This applies not only to the option to count large numbers of grains, but also to the lengthy pursuit of trying to decide whether or not a given grain is touching another or not. As a measure of the accuracy regarding the number of grains counted, we would suggest

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counting the total number of singles from a number of frames (pictures) from a given step, ten pictures for instance. Then take an individual tally of the singles vs. the number in groups on each frame and compare it to the average found in ten frames. This will give a percentage deviation from the average and should allow one to operate within a known percentage error.

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